REMARKS

The Office Action dated August 17, 2011, has been carefully reviewed, and the foregoing amendment has been made in consequence thereof.

Claims 1-3, 5-6, 15-17, 19-20, 29-31, and 33-34 are pending in this application. Claims 1-3, 5-6, 15-17, 19-20, 29-31, and 33-34 stand rejected.

Applicants and Applicants' representative wish to sincerely thank Examiner Motsinger for his time and the courtesies extended during an Examiner Interview conducted on October 21, 2011. During the interview, the two principle references, i.e., Hsieh and Li were discussed in light of the current Office Action and the present application. No agreement was reached.

The rejection of Claims 29-31 and 33-34 under 35 U.S.C. § 101 is respectfully traversed. Applicants have amended Claims 29-31 and 33-34 based on the suggestion proposed by the Examiner on page 3 of the Office Action. Specifically, each of Claims 29-31 and 33-34 have been amended to read "A non-transitory computer storage medium ...." Accordingly, Applicants submit that Claims 29-31 and 33-34 are in compliance with Section 101. Applicants also respectfully submit that "non-transitory computer-readable media" comprise all computer-readable media, such as a firmware, floppy disk, CD-ROMs, DVDs and another digital source such as a network or the Internet, as well as yet to be developed digital means, with the sole exception being a transitory, propagating signal. For at least the reasons set forth above, Applicants respectfully request that the Section 101 rejection of Claims 29-31 and 33-34 be withdrawn.

The rejection of Claims 1, 5-6, 15, 19-20, 29, and 33-34 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,449,330 to Li et al. (hereinafter referred to as "Li") in view of U.S. Patent No. 6,529,575 to Hsieh (hereinafter referred to as "Hsieh") and "Generalized multi-dimensional adaptive filtering for conventional and spiral single-slice, multi-slice, and cone-beam CT" by Kachelriesss et al. (hereinafter referred to as "Kachelriess") is respectfully traversed.

Li describes a computed tomography (CT) imaging system (10) that includes an x-ray source (14), a detector array (18), and a data acquisition system (DAS) (32) that samples analog data from detector array (18) and converts the data to digital signals for subsequent processing. During a scan to acquire x-ray projection data, x-ray source (14) rotates about a center of rotation (24) to generate projection data. A set of three threshold values selected based on a study of clinical images are used to reduce artifacts in the projected images. Different sets of smoothing kernels are associated with the different thresholds to reduce adverse effects of smoothing and artifact correction on image resolution and sharpness. Less smoothing is applied to the highest threshold, and stronger smoothing is applied to the smaller threshold. Thus, a smoothing kernel is used in accordance with the selected set of threshold to produce a set of smoothed projections from a set of original projections. The amount of smoothing varies depending upon the relationship of the original projections (i.e., the data comprising the original projections) to the thresholds.

Notably, as acknowledged on page 5 of the Office Action, Li does not describe or suggest utilizing smoothing kernels and projections to produce projections smoothed in three dimensions in accordance with a set of thresholds such that when a first threshold of the set of thresholds is triggered smoothing in three dimensions is performed and when the first threshold is not triggered smoothing in three dimensions is not performed. Also, notably, Li does not describe or suggest scaling the projections by multiplying the projects with a constant value. Rather, Li merely describes using a plurality of thresholds to smooth original projections.

Hsieh describes a system for reducing noise in an x-ray image. The system includes a gantry having an x-ray source and a radiation detector array. The gantry defines an object cavity, and the x-ray source and the radiation detector array are rotatingly associated with the gantry so as to be separated by the object cavity. The system also includes an object support structure movingly associated with the gantry so as to allow communication with the object cavity and a processing device having an adaptive projection filtering scheme. The filtering scheme generates system information, obtains original projection data, and determines a data characteristic of the original

projection data. One feature of the adaptive projection filtering scheme is the use of air-cal vectors that are responsive to channel-to-channel gain variation as a function of detector angle and channel average intensity. The data characteristics of the original projection data include a calculated standard deviation value, a high deviation threshold level, a low deviation threshold level, and measured variation data. Once the measured variation data is obtained, the original projection data is processed so as to create filtered projection data. This is preferably accomplished by first comparing the measured variation data with the calculated standard deviation together with the high deviation threshold level and the low deviation threshold level. The filtering scheme further processes the original projection data responsive to the system information and the data characteristic so as to create filtered projection data, and calculates resulting projection data responsive to the filtered projection data.

Notably, Hsieh does not describe or suggest utilizing smoothing kernels and projections to produce projections smoothed in three dimensions in accordance with a set of thresholds such that when a first threshold of the set of thresholds is triggered smoothing in three dimensions is performed and when the first threshold is not triggered smoothing in three dimensions is not performed. Also, notably, Hsieh does not describe or suggest scaling the projections by multiplying the projections with a constant value. Rather, as best understood by Applicants, Hsieh is silent with respect to smoothing kernels, smoothing in three dimensions when a threshold is triggered, not smoothing in three dimensions when a threshold is not triggered. Also, Hsieh does not describe or suggest scaling the projections by multiplying the projections with a constant value. Rather, Hsieh merely describes filtering projection data using corrections based on detector angles.

Kachelriess describes a filter width that is set as a function of a given, view dependent threshold T, and the threshold function is determined as a function of the underlying object or anatomy. Kachelriess also describes using three-dimensional adaptive filtering. Kachelriess further describes using a binary selection of either no filtering or using a single, maximum filter width, both as a function of the threshold T.

Notably, Kachelriess does not describe or suggest scaling the projections by multiplying the projections with a constant value. Rather, Kachelriess merely describes using either no filtering or using a single, maximum filter width as a function of a threshold T.

Claim 1 recites a method for reconstructing an image of an object in a computed tomographic imaging system. The method includes "scanning an object using a computed tomographic (CT) imaging apparatus to acquire projections of the object; determining, utilizing the projections, a set of thresholds; scaling the projections by multiplying the projects with a constant value; associating selected smoothing kernels with the thresholds; utilizing, via the computed tomographic imaging system, the smoothing kernels and the projections to produce projections smoothed in three dimensions in accordance with the thresholds such that when a first threshold of the set of thresholds is triggered smoothing in three dimensions is performed and when the first threshold is not triggered smoothing in three dimensions is not performed; and filtering and backprojecting the projections to generate an image of the object in the computed tomographic imaging system."

No combination of Li, Hsieh, and Kachelriess describes or suggests a method for reconstructing an image of an object in a computed tomographic imaging system as is recited in Claim 1. Specifically, no combination of Li, Hsieh, and Kachelriess describes or suggests scaling projections by multiplying the projects with a constant value prior to smoothing. Rather, Li merely describes an x-ray source that rotates about a center of rotation to generate projection data, Hsieh merely describes filtering projection data using corrections based on detector angles, and Kachelriess merely describes using either no filtering or using a single, maximum filter width, both as a function of a threshold T.

Applicants respectfully traverse the assertion on page 4 of the Office action that "Hsieh discloses ... scaling ... the projections (... note the channel-to-channel gain is removed by the air calibration vector lines 45-60 [and] note various corrections are made to the projections prior to filtering)." Applicants respectfully submit that the adaptive projection filtering scheme use of air-cal vectors that are responsive to channel-to-

channel gain variation as a function of detector angle and channel average intensity are not equivalent to the scaling recited by Applicants in Claim 1. The air-cal vectors of Hsieh are necessarily variable as a function of the detector angle associated with each vector. In contrast, the scaling multiplication values of the present application are constant. Therefore, Applicants respectfully request reconsideration of such assertion.

Accordingly, Claim 1 is submitted as being patentable over Li in view of Hsieh and Kachelriess.

Claims 5 and 6 depend from independent Claim 1. When the recitations of Claims 5 and 6 are considered in combination with the recitations of Claim 1, Applicants submit that dependent Claims 5 and 6 likewise are patentable over Li in view of Hsieh and Kachelriess.

Claim 15 recites a CT imaging apparatus including "a detector; a source configured to project a beam of x-rays toward said detector; and a computer system operatively coupled to at least one of said detector and said source, said computer system comprising: a first module configured to scan an object to acquire projections of the object and to scale the projections by multiplying the projections with a constant value; a second module configured to determine, utilizing the projections, a set of thresholds; a third module configured to associate selected smoothing kernels with the thresholds; a fourth module configured to utilize the smoothing kernels and the projections to produce projections smoothed in three dimensions in accordance with the thresholds such that when a first threshold of the set of thresholds is triggered smoothing in three dimensions is performed and when the first threshold is not triggered smoothing in three dimensions is not performed; and a fifth module configured to filter and backproject the projections to generate an image of the object."

No combination of Li, Hsieh, and Kachelriess describes or suggests a CT imaging apparatus as is recited in Claim 15. Specifically, no combination of Li, Hsieh, and Kachelriess describes or suggests scaling projections by multiplying the projections with a constant value prior to smoothing. Rather, Li merely describes an x-ray source that rotates about a center of rotation to generate projection data, Hsieh merely describes

filtering projection data using corrections based on detector angles, and Kachelriess merely describes using either no filtering or using a single, maximum filter width, both as a function of a threshold T.

Accordingly, Claim 15 is submitted as being patentable over Li in view of Hsieh and Kachelriess.

Claims 19 and 20 depend from independent Claim 15. When the recitations of Claims 19 and 20 are considered in combination with the recitations of Claim 15, Applicants submit that dependent Claims 19 and 20 likewise are patentable over Li in view of Hsieh and Kachelriess.

Claim 29 recites a computer storage medium comprising instructions thereon. The instructions are configured to instruct a computer to: "determine, utilizing projections obtained by scanning an object, a set of projection thresholds; scale the projections by multiplying the projections with a constant value; associate selected smoothing kernels with the thresholds; utilize the smoothing kernels and the projections to produce projections smoothed in three dimensions in accordance with the thresholds such that when a first threshold of the set of thresholds is triggered smoothing in three dimensions is performed and when the first threshold is not triggered smoothing in three dimensions is not performed; and filter and backproject the projections to generate an image of the object."

No combination of Li, Hsieh, and Kachelriess describes or suggests a computer storage medium as is recited in Claim 29. Specifically, no combination of Li, Hsieh, and Kachelriess describes or suggests scaling projections by multiplying the projections with a constant value prior to smoothing. Rather, Li merely describes an x-ray source that rotates about a center of rotation to generate projection data, Hsieh merely describes filtering projection data using corrections based on detector angles, and Kachelriess merely describes using either no filtering or using a single, maximum filter width, both as a function of a threshold T.

Accordingly, Claim 29 is submitted as being patentable over Li in view of Hsieh and Kachelriess.

Claims 33 and 34 depend from independent Claim 29. When the recitations of Claims 33 and 34 are considered in combination with the recitations of Claim 29, Applicants submit that dependent Claims 33 and 34 likewise are patentable over Li in view of Hsieh and Kachelriess.

For at least the reasons set forth above, Applicants respectfully request that the Section 103 rejection of Claims 1, 5-6, 15, 19-20, 29, and 33-34 be withdrawn.

The rejection of Claims 2-3, 16-17, and 30-31 under 35 U.S.C. § 103(a) as being unpatentable over Li in view of Hsieh and Kachelriess is respectfully traversed.

Li, Hsieh, and Kachelriess are described above.

Claims 2 and 3 depend from Claim 1. As stated above, Claim 1 is submitted as being patentable over Li in view of Hsieh and Kachelriess. When the recitations of Claims 2 and 3 are considered in combination with the recitations of Claim 1, Applicants submit that dependent Claims 2 and 3 likewise are patentable over Li in view of Hsieh and Kachelriess.

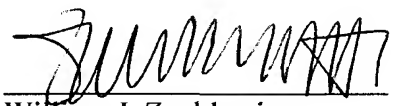
Claims 16 and 17 depend from Claim 15. As stated above, Claim 15 is submitted as being patentable over Li in view of Hsieh and Kachelriess. When the recitations of Claims 16 and 17 are considered in combination with the recitations of Claim 15, Applicants submit that dependent Claims 16 and 17 likewise are patentable over Li in view of Hsieh and Kachelriess.

Claims 30 and 31 depend from Claim 29. As stated above over Li, Hsieh, Claim 29 is submitted as being patentable over Li in view of Hsieh and Kachelriess. When the recitations of Claims 30 and 31 are considered in combination with the recitations of Claim 29, Applicants submit that dependent Claims 30 and 31 likewise are patentable over Li in view of Hsieh and Kachelriess.

For at least the reasons set forth above, Applicants respectfully request that the Section 103 rejection of Claims 2-3, 16-17, and 30-31 be withdrawn.

In view of the foregoing amendment and remarks, all of the claims now active in this application are believed to be in condition for allowance. Reconsideration and favorable action are respectfully solicited.

Respectfully Submitted,



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